# Scientific American.

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## Rail Road News.

### Extraordinary Speed.

The remarkable feat has just been accomplished of effecting a communication by railway between London and Paris in the space of 8½ hours. In order to promote the restoration of the mails to the district route, via., Boulogne, a deputation of shareholders in the Boulogne and Amiens Company made arrangements to test the time in which the distance could be performed, and the result has been that they have contrived to deliver on the Bourse in the middle of the day of Tuesday, London papers of the same morning. It appears they started from London at 5 A. M., left Folkestone at 7, accomplished the voyage to Boulogne in two hours, quitted Boulogne in a special train at 9½, and reached Amiens, a distance of 76 miles, in an hour and 40 minutes. At Amiens they remained 10 minutes, and then, at 20 minutes past 11, proceeded to Paris, where they arrived at 1½—making the total eight hours and a half. This is probably the quickest trip by more than four hours that has ever been accomplished between the two capitals.

### Great Railroad Rope.

A rope for the Columbia Railroad, west of the Schuylkill river, Pa., has been manufactured for the inclined plane, by Messrs. J. Whetham & Son, Philadelphia. It required fourteen tons of hemp for its construction, and it was six thousand feet long, nine inches round, and weighed, when completed, twenty-five thousand pounds. This rope was made in less than ten days, and the manufacturers have given a guaranty that the rope should transport 80,000 cars over the plane, which, we understand, is about the average service performed by two previous ropes furnished from their manufactory.

### Railroad Trial.

During the month of last May, the cars on the Saratoga track were thrown off by obstructions placed on the rails, killing the engineer and mutilating the fireman. Mr. John Tallmadge, a respecable farmer on the road, was taken up and imprisoned for the act, he being publicly held guilty. His trial came on two weeks ago, at Balston, before Judge Wright, when he was fully acquitted, and the two principal witnesses were arrested,—the accusers taking the place of the accused.

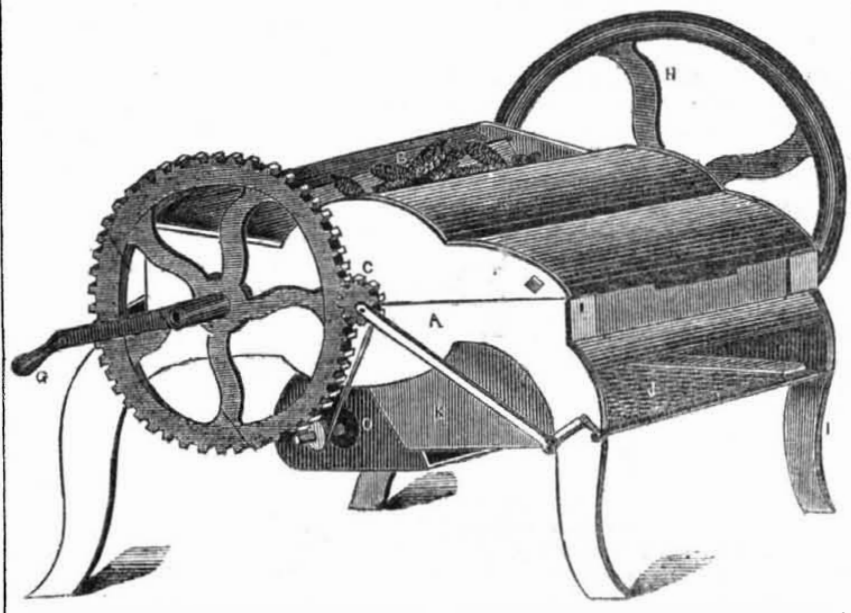
### Railroad Celebration.

The Rutland and Burlington Railroad was opened to public travel, its entire length, on Tuesday the 18th ult. It is about 120 miles in length, with a rising grade of 1200 feet necessarily averaging in one place, for seven miles a grade of 60 feet to the mile. The work has been constructed in less than three years, at about the original estimates, or less than $25,000 per mile.

### Prussian and German Railroads.

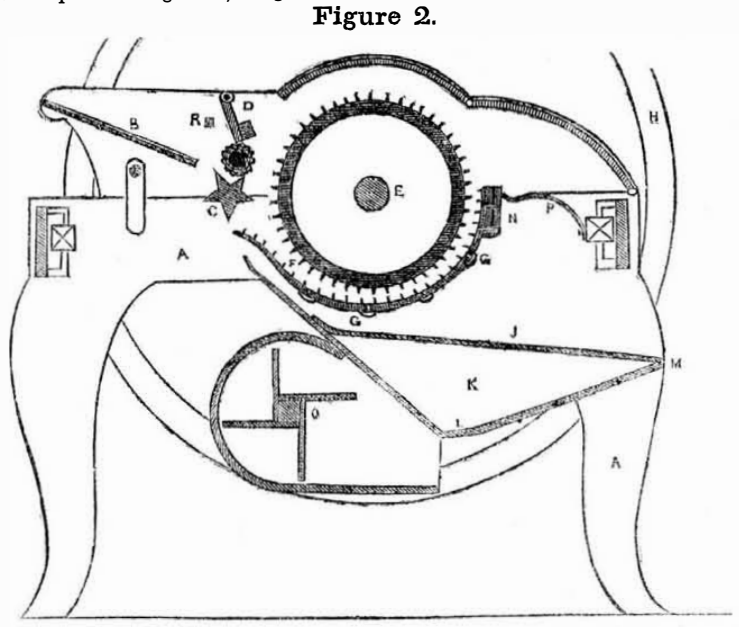
The extent of Railroads in the Kingdom of Prussia is 2,025 miles. In Austria there is about 700 miles, and 248 in the course of construction. All the remaining States of Germany have about 1,148 miles.

## IMPROVED CORN SHELLER..---Fig. 1.




This improved Corn Sheller of D. W. Harris, and E. P. Carter, of Yorkshire, N. Y. The improvements on this machine are of an excellent character, as will be observed by the description. Figure 1 is a perspective view, and fig. 2 is a vertical section, showing the interior. The same letters refer to like parts. A is a frame, made of iron or wood; B is an inclined apron, on which the ears of corn are thrown indiscriminately; C is a fluted feed roll at the foot of it, the flutes being large enough to admit an ear of corn. This fluted roll revolves below a swinging gate, D, which is hung on pivots at the sides, but is prevented from swinging too far, by a stop, R, (one at each side,) and there is a weight behind which is now pressing against it; E is a toothed cylinder, revolving in a toothed concave bed, which is made wide where the ears are received, and the space between the wheel and it, is gradually decreased to the back part. C is a pinion outside, geared with the cylinder, E, and the large wheel on the shaft of the feed roll, and is driven by a crank, or other power. H is a fly wheel on the cylinder shaft. The concave is composed of segments, hinged together by links, G G. It is also pierced with holes, (readily conceived though not seen,) through which the shelled corn drops. The segment of the concave, F, however, farthest from the feed roll, is divided into different sections and fastened to a bar, N, which is of the same length of the rest of the concave and linked to it directly under each section; to the bar is fastened two small springs, which allows some elastic play of the concave, to strip all the corn off the smallest as well as the largest ears. There is also a large elliptic spring, P, fastened at each side of the frame, at I, and fits into a groove in each end of the bar, N. The concave bed at the feed roll end is fastened to the frame, and the back end of it rests on the springs, P. This allows the concave bed to adapt itself either altogether or in sections, to any and all the ears of corn of different or any size—an excellent provision, indeed, for this purpose, while the small sections behind, work independent of the rest, and strip off the smallest kernels that may pass between the sections. The cylinders in this machine, for hand power, are about 16 inches long and about 4 in diameter. The

**Figure 2.**




shelled corn drops through the holes spoken of in the concave bed, and fall on the inclined screen, J, where is is separated from any larger pieces of the cobs that may be broken; this machine does not break the cobs except it may sometimes be their tips. These pieces of cobs are discharged at M, and the corn drops through the screen, and is received in a funnel shaped recess, K, and discharged at the apex, L, when it meets with a current of air from the blower, O, (as is represehted in fig, 1,) which cleans the corn from every impurity.—The ease with which this machine operates, and the perfection of the work accomplished by it, makes it very valuable, and it will no doubt meet with general favor. Communications, (*p. p.*) addressed to the inventors, will meet with prompt attention, or to Miles Carter. Esq. Messrs. Barclay & Danforth own the right for New Jersey.

## Useful Receipts.

### The Art of Washing Clothes.

INDIANAPOLIS, Dec. 20, 1849.

MESSRS. EDITORS—The remarks in your excellent paper of Dec. 15th, upon washing and labor-saving soap, induce me to send for insertion the following recipe, which I have followed for a long time with complete success: 1 lb. of sal soda, 1 lb. common bar soap, and 6 quarts soft water; boil all together 2 hours, stirring frequently, then set the mixture away to cool for use. In washing take a pint of this mixture for the largest pail of water, and heat till it boils, having previously soaked the clothes in warm water; wring them out and put them in to boil one hour. Then take them out, put them in a tub with soft water, rub any spots that may not be entirely removed, turn the clothes wrong side out, then put them in blue rinsing water, wring them out, and they are ready to hang out for drying.

This method does not injure the texture of the clothes; it is best to prepare all the water to be used at once, than to reserve a part for the second and third boiling.

C. M. E.

### Smoky Chimneys.

Lieut. Col. W. Mason, in a letter to the Builder, gives the following cure for a great and common evil: "A smoky chimney and a scolding wife are two of the worst evils of domestic life," says the old proverb; and to obviate the first evil ingenuity is ever racking its brain. Hence, Regent street and every part of the metropolis has its house tops bristling with pipes and deformed by cowls in every conceivable and almost inconceivable variety. Now, I have built many chimneys in all possible situations and have found one simple plan everywhere succeeded, the secret being only to construct the throat of the chimney, or that part of it just above the fire-place, so small that a man or a boy can barely pass through it. 2ndly. Immediately above this the chimney should be enlarged to double its width, like a purse, to the extent about two feet in height, and then diminished again to its usual proportions. No chimney that I ever constructed thus, smoked.

### Transplanting Trees.

As soon as the foliage has dropped, transplant ornamental, shade or fruit trees. There will be a saving of one year's growth between those planted now and those in the spring. In taking up trees, great care should be taken not to mutilate their roots, for every fibre of the root lost, the growth of the tree will be retarded so much, and its life endangered.—Whenever it is absolutely necessary to part with any of the roots, take off the top in proportion. Let the holes be larger than the roots and never bend or cramp a root into a small hole. Where the root is mutilated, make a clean cut with a sharp knife, and new rootlets will show themselves, pushing out between the bark and wood. If your soil is poor, fill in the holes with rich earth from the woods or swamps. But in no case use stable manure in planting out trees in this climate. Top-dress the ground among your trees with leached ashes, lime or any decomposing vegetable matter that you may have. If rabits are troublesome in barking your fruit trees apply soft country soap to the trunks, two or three times in the year. This is a certain protection against the depredations of rabbits, and is a great invigorator of the tree.

The Maine Farmer recommends charcoal roads.

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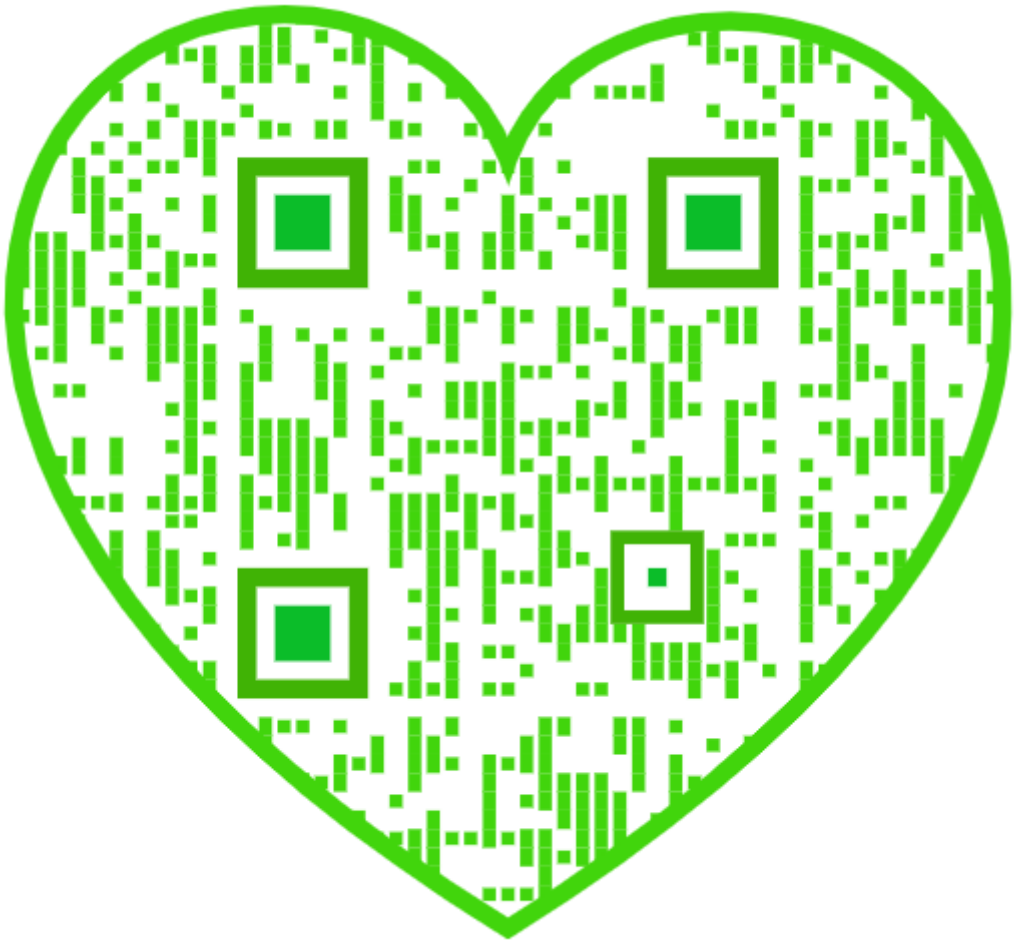

# Miscellaneous.

Correspondence of the Scientific American.

WASHINGTON CITY, Dec. 30, 1849.

It having been announced that Mr. Paine is coming on here with one of his patent machine's for decomposing water and there by producing a motive power, our mechanics and scientific men are all on the look out for it. As the invention is said to have removed completely the only obstacles which have hitherto existed to æerial navigation, viz., the difficulty of procuring hydrogen gas, and carrying a supply of fuel. Who can foretell what a revolution may now be effected in the mode of transportation! May we not look for the superseding of such slow affairs as rail-way cars. by baloon locomotion, and æerial stages! In this nineteenth century, we are warranted in expecting any thing and every thing. Then again, the invention is said to light and warm houses without fuel, by the mere winding up of a weight like that of a clock, once a day. So now the coal dealers and wood merchants, and stove makers, will have to go into mourning, for "their occupation is gone." It is said that by the simple operation of a very small machine, without galvanic batteries, or the consumption of metal or acids, as only the application of less than one three hundredth part of one horse power, Mr. Paine produces 200 cubic feet of hydrogen gas, and 100 feet of oxygen gas per hour. The quality of these gasses, the actual cost of which is less than one cent, will, it is said, furnish as much heat by combustion as 200 feet of the ordinary coal gas, and sufficient to supply light equal to 300 common lamps for 10 hours.

It has been truly observed that the progress of science for the last century, has outstripped all calculation, and left even the wildest imagination far in the rear. Is this astonishing progress to continue; and will nature in years to come, yield to man her long treasured secrets as willingly as she does now? If so, what mortal shall venture to limit the boundaries of human knowledge, or the power of human skill? "There is indeed," says a late writer, "no reason why the earth should not supply us with water hot, as well as cold, any more, perhaps, than why mechanical attrition or compressed air should not keep us as warm, the electric fluid light our streets and houses; convey our messages, set our clocks going, and possibly, also perform some of our hard work."

A mechanic from Vermont is about applying for a patent for an umbrella which shuts up in a case like a telescope, so that it may be put into the pocket. This will be a capital thing, in dry weather, but pocketing a *wet* umbrella after a shower, would not be very comfortable. I wonder how many of our readers know who was the original inventor of the umbrella? It was Jonas Hanway, an Englishman, a man whose name is associated with philanthropic enterprises and liberal benevolence. After steadily undergoing the laughing, jeering, hooting and bullying of the hackney coachmen, whose business the umbrella severely affected. Mr. Hanway finally established the fashion.

For the information of persons coming on here for the purpose of examining the models in the Patent Office, I would state that upon application to the Commissioner, he will send a machinest round with them for that purpose, who will give any information or explanation which may be desired, without charge. In the absence of such knowledge, many persons are induced to pay individuals representing themselves as "agents," who are constantly hanging about the office. The respectable agents are always to be found when their services are required, at their offices. To persons desiring to procure patents, the cheaper mode by far is to employ a good New York agent, by whom the business can be done without the expense of a journey by the applicant to the metropolis.

We have several inventors now in the city, who have adopted the plan of lecturing in the streets, upon the merits of their inventions. It is true they draw a great crowd, but as their auditors are politicians instead of mechanics, they spend their labor in vain. Were however a machine invented for turning men out of office, and putting others in, the happy inventor would be immortalized.

I hear that the heirs of James Rumsey are again about memorializing Congress for an appropriation on the ground that Mr. Rumsey was the true originator of steam navigation, although it has been so universally conceded to Fulton. It is said that Mr. R. propelled a boat by steam on the Potomac, at Shepherdstown, Va., in 1785, and that subsequent to that time the Maryland House of Representatives, after hearing testimony, recommended that a gold medal should be struck and presented to his son for the invention.

I do not know whether you have published a description of the machine now in use at our Arsenal for the manufacture of percussion caps. The machine occupies a space of about two and a half by four feet, and embraces all previous inventions. A sheet of copper 14 by 25 inches, being placed on a plain surface, denominated a "table," and the motive power applied, the sheet, by an alternate motion, passes immediately under the cutting die, which forms perfect caps, and throws them into holes around the edge of a "charging plate" some eighteen inches in diameter. With a rotary motion, and its edges studded successively with new formed caps, the plate passes, at one third its diameter, directly under a cap containing the percussion powders, from which drops with singular regularity, a sufficient quantity for a charge, into each cap. Progressing round at another point, is a very fine punch, which completes the job of charging by pressing home the powder; and at a third point, a small instrument throws the caps from their lodgement, tosses them into a funnel, through which they fall into a drawer beneath. Thus by the same unchanging motion, in the cutting die furnished with material the caps are manufactured, loaded, prepared, and thrown into a box beneath at the rate of 4000 per hour, requiring the aid of but one person.

### The Christian Philosopher.

Two weeks ago we referred to a remark made in an exchange about Dr. Dick being "refused a pension, because of the *liberal tendency* of his writings, and that unless he was assisted by private benevolence, he would be left to starve." It was proposed in the article referred to, that public lectures should be delivered on his character and writings, in our principal cities, and the proceeds applied to his benefit. We stated that we did not believe a word in the paragraph alluded to, except its character of untruth. We are of the same opinion still, but we do not believe that Dr. Dick is in any other condition than that of penury, and we stated then that those who published and profitted by his works should be made to disgorge. In a letter of Dr. Dick to Elihu Burritt, in the "Christian Citizen," we perceive that Dr. Dick is poor indeed, but to help him by public lectures, would cut the old man's heart. He says—

"It is true, I have made comparatively little in a pecunary respect for the volumes I have published. For the 'Christain Philosopher' I received only $120, for the entire copyright. The work has passed through ten large editions, and I presume the publisher has realized upon it of clear profit at least £1,800. For the copywright of the 'Philosopher of a Future State' I received £80. For 'The Improvement of Society by the Diffusion of Knowledge,' I received about £100, and I am entitled to nothing further, whatever number of editions these may pass through; and I need scarcely say that I have received nothing for any of these from America. My other works procured sums somewhat similiar to those now stated. For one or two of the volumes, I received certain sums from the Messrs Harper of New York, for transmitting corrected sheets previous to publication. A little addition to my present income would certainly be acceptable; and if your American brethren were to come spontaneously forward to offer a sum as a Testimonial that they had derived some benefit from my writings, I certainly would not refuse it. For they have been enabled to possess my writings at a much cheaper rate than in this country, in consequence of my not having a copy-right in America. But I would not urge any such claim, unless it seemed to be granted spontaneously."

This letter was written to Mr. Burritt, in answer to one which proffered him something like a testimonial. Such a testimonial, to be acceptable to the Christian Philosopher, must be a heart-offering—not a false philanthropy, and we say that there can be no living christian who owns his works in this country, but is in a fair, honest, conscientious business matter, in debt to him at least one dollar on every volume. We hope that it will be paid, and that Messrs. Harpers, in their abundance, will be liberal. The works of Dr. Dick are of a highly scientific character—the best of the kind in existence—let not the old philosopher go down to the grave in poverty, after having enriched the world by his genius. Money may be sent, post-paid, to the Editor of the Christian Citizen, at Worcester, Mass., and if any person in this city desires to contribute his true noble offering, the Editor of this paper will be responsible for any sums entrusted to his care. Dr. Dick resides near Dundee, Scotland.

### Rights of Inventors.

These are natural rights. The right to the production of one's own labor of the intellect, is a right founded in nature and justice.

Many of the useful inventions which add much to the comforts, ornaments and convenience of civilized life, are the result of the incessant labor of the hands and head of some poor man who has gone down to his grave in penury and want. Such was the fate of the immortal Guttenberg, the inventor of the art of printing by moveable types.

The Governments of the civilized world have sought to protect the rights of inventors by laws which secure to them the first fruits of their labor and to society the second; but there is a period in many inventions in which the inventor is in great danger of being cheated out of his just rights; it is that period that sometimes elapses between his inventions being made known, or published to the world, and the time when he gets his patent.

There are persons, and we could hope for the honor of human nature, that their number is few—who have neither the industry, intellect nor ingenuity, to make a valuable discovery or invention themselves, who seize upon the inventions of others, and appropriate them to their own use; this is a species of stealing that embodies all that is low and mean.

The high-minded, whole-souled, full-length-ed man scorns to appropriate to his own use the labors of others without just compensation.

### Southern Manufactures.

The N. O. Bulletin says:—On Saturaday one hundred and fifty bales of cotton goods arrived in one vessel at this city from Pensacola, being the production of the cotton factory on Black River, about twenty miles from the above place. Two hundred bales from the same factory arrived here about ten days since.

This factory is worked entirely by negro operatives, under three white overseers and managers, and is doing a thriving business. It is establishments of this kind that will insure the real independence of the South, and no one thing would add so rapidly to its wealth than the withdrawal of a portion of the black labor now employed in cultivating cotton, and applying it to the manufacture of the article.—Such a plan would act in a double ratio in favor of the South by increasing the value of the raw material by reason of lessened production and retain millions at home which it now pays to Northern and European manufacturers.

### Triumph of Surgery.

Surgery as a science, of late years, has extended its operations into new field, and noses, lips and lower jaws are supplied from portions of the face and head with as much facility as the broken nose of a statue can be restored with a little clay. The New York Journal of Commerce records a singular case of a man who presented himself to Professor Parker, of the Crosby Street Medical School.—He was suffering from a cancerous affection of the lower lip and jaw, both of which were extensively diseased. It was decided that they must he removed, or death would soon follow. The man consented, and was put under the influence of chloroform. Not only the lip, but most of the lower jaw was cut away, leaving a hideous opening directly into the throat. To close up this aperture, and enable the man to retain food, dissections were carried on nearly to the ear and downward, until "flaps" large enough to bring them round beneath the upper jaw, and nearly close up the opening, were secured. The wound has since healed.—the man's lower jaw is gone, and his mouth, which now is merely an opening under the upper jaw, enables him to take simple food; but he has no power of mastication. Distinct articulation is lost, and yet he contrives to make himself understood by a guttural sort of language. This is the sixth operation which had been performed upon this man, and yet another will probably be necessary.

### Smithsonian Institute, Washington.

At a recent meeting of this body, Dr. Riotrey, of Paris, made some very interesting and scientific observations on the subject of consumption. Post mortem examinations had shown that nature, under certain circumstances, cures the disease. It was important to enquire what these circumstances were. From the extensive field of the author's remarks on France, Holland and Great Britain, it appeared that a cure was effected whenever thin and attenuated men changed their climate and habits, one or both, and in consequence developed a tendency to become fleshy; he considered a high northern and southern latitude alike favorable. He named the American coasts from latitude 55 deg. north 17 deg. south as consumptive latitudes. He deemed all the temperate latitudes unfavorable.

Prof. Maury said that lat. 17 deg. south was precisely the point where the trade winds relieved from their moisture by the Andes, produced a dry air. Dr. Gale said that Natchez was a favorable point, in the Mississippi Valley, for consumptives; yet Natchez had a very humid climate, Dr. Borland (U. S. Senate) confirmed these views. The nights were exceedingly damp. The wind blew up the river bringing the dampness from the Gulf. Prof. Henry attributed the deleterious effect in consumption rather to the amount of change in the thermometer at given points than to the actual state of temperature. Prof. Maury represented the coast of Patagonia as literally submerged with rain; twenty one feet of rain had actually fallen in thirty one days; and he represented the natives physically a most miserable race. Mr. Schoolcraft said that it was then a popular error that they were of taller stature than any other Indians. The whole discussion assumed a tone of high interest.

Prof. Johnson reported on the chemical properties and value of the North Carolina coal field. He also remarked on other coal basins in the United States. Two new species of birds were presented from the Rio Grande. One of these was the chaparelle cock. Donations of books were made to the library from several sources.

### Georgia Manufactures.

The Columbus, Geo., Times says that a lot has been sold in that place for a cotton factory of 5000 spindles.

The purchaser is Mr. Wm. H. Young, of Florida, a gentleman of great business capacities, shrewdness and enterprise. So we go.—Columbus will be a Georgia Lowell before long, and some of these days will beat her.—Lowell never had, nor can never have, the advantages with which Columbus is endowed by nature and position, for manufacturing purposes. It is a significant circumstance that a member of a large Philadelphia House was here last week, soliciting consignments of Columbus cotton fabrics for his firm in Philadelphia.

### Singular Phenomenon.

On Christmas night, the tides in the East River were so low that some of the ferry-boats were unable to make their regular trips—a phenomenon never paralleled before, "in the memory of the oldest inhabitants."

The communication between New York and Brooklyn was suspended, and many people were terrified. The low tide and a westerly gale was the cause.

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For the Scientific American.

## Important Discovery that may Lead to Improvements of Great Value.

(Continued from page 83.)

We are well aware that in a discovery of this kind, offering views so entirely novel on familiar things, and so apparently controverting long established ideas, nothing short of the most positive proof will satisfy mankind. If we are right, New York may immediately be placed within five days of London, and Oregon within ten days of China. That a theory pointing to such results is one of vast importance, no man of science will deny. To waste time on such a theory, if false, could be of no possible benefit to us; we therefore wish to to expose our argument and our theory to the most rigid scrutiny, and if we are wrong, we hope that scientific men will point out to us where our error lies.

We have thought of submitting more than one hypothesis, in order to make the subject as clear as possible, but before giving another we think it will help to make the principles familiar if we reply to a pamphlet on air-navigation that has lately been placed in our hands.

That pamphlet is indeed a most interesting proof that we were right in asserting that the philosophy, or law of inertia, has not been properly understood by men of science. If it had been, the author surely could not have fallen into so great an error, nor would other scientific men have failed to answer his challenge. The pamphlet is entitled "Ærial Navigation: the practicability of travelling pleasantly and safely from New York to California in three days, fully demonstrated, with a full description of a perfect ærial locomotive, with estimates of the capacity, speed, and cost of construction, by Rufus Porter." From this pamphlet we quote the following paragraph.

"It is a very easy thing for wise men, or even reputed scientific men, to shake their heads with the exclamation "Moonshine;" but it is a notorious fact that the scientific men of New York and of the world, have been repeatedly challenged to produce any argument or reason against the feasability of the plan herein proposed and described. But hitherto no person has attempted a scientific refutation."

If now we can show that the author of that pamphlet is wholly mistaken on this subject, so far at least as we claim there has been ignorance; and that he has repeatedly challenged the science of the world in vain to point out his error, an error that our theory will clearly point out and explain; if we can do this, we most certainly add another, and no small item to the proofs we have given.

For his sake we are sorry that we did not see his pamphlet sooner. We could have saved him from much expense, and perhaps from some of the chagrin of disappointment, by pointing out his error before he had gone so far. We are sorry to see men commit such errors, because it is a great check to the world's advancement. It makes men of capital afraid of any proposed improvement, no matter how valuable it may be. When asked to assist in anything of even the highest worth, they immediately think of such failures, and then they dare not lend a helping hand.

Without taking the trouble to look over his estimates, we shall take it for granted that he is right in his figures. Well then, he tells us that the area of his spindle (gas holder) is 1900 feet, and that its motion is to be 146 feet per second, and that from its peculiar shape it removes the air only at the rate of five feet per second, and that a foot of air weighs more than one ounce.

Such are all the data we need, to enable us to show that the result he aims at is wholly impossible.

If his whole machine moves 146 feet a second, then the widest part of it moves 146 feet per second: if the widest part of it moves 146 feet per second, then a cylinder of air 146 feet long, with 1900 feet area must be removed in a single second of time, and he tells us that it is removed at the rate of five feet a second. Such are the circumstances, and therefore the question is simply this—What power will it require to remove such a body of air at the rate of motion given. If we have made no mistake in multiplying, 1900 times 146 are 277,400 ounces, or 17337 pounds. That is to say, 17337 pounds of air must be removed from its position in a single second.

It has often been said that a pound of feathers is as heavy as a pound of lead; so also it is true that 17,337 pounds of air are as heavy as 17,337 pounds of lead. But if we were to roll such a ball of lead from the top of a precipice, it would require all the force of the Earth's attraction to move it downwards about 16 feet in one second, that is, it would require a force equal to 17,337 pounds. So also if that cylinder of air was confined in a bag and rolled from a precipice, and there was no surrounding air to buoy it up, it would require all the earth's attraction to give it a motion equal to 32 feet in one second. But the earth's attraction is equal to a spring ballance drawn to 17,337 pounds. Therefore it would require a force equal to that number of pounds to overcome the inertia of that cylinder of air so as to give it a motion of 32 feet a second; and to move one-eighth of that rate, or about 4 feet a second, would require one-eighth of that power, or a force of attraction equal to 2,167 pounds; but Mr. Porter says it is moved at the rate of five feet a second; that is one-fourth more, or 2,709 pounds.

To produce such attraction as that, would require a steam engine of 719 horse power even if it had a solid fulcrum to act against, which it has not, but on the contrary it has a far worse substance for a fulcrum than steamboats have, yet they waste from one-fifth to nine-tenths of their power from this cause. If the propelling fans were set at an angle of 45 degrees there would be one half of the whole power wasted in the tendency to throw the air in the direction the fans revolved; and with the best possible adjustment there would from this cause be probably a loss of more than one fifth.

The loss from the yielding of the fulcrum is easily estimated, and by a rough cast we make that also over one-fifth, so that we get a grand total of over one thousand horse power, as the least that could possibly propel the spindle alone at the rate required, and there still remains the resistance to the saloon unaccounted for, which would probably be equal to 250 horse power more. In addition to all this we have another resistance that we cannot estimate, although we know that it exists. The cylinder of air that we have made the estimate upon, cannot be moved without to some extent moving the surrounding air, but we have no means of knowing the value of that resistance, nor does it matter to our present purpose, so long as we know we are within the truth.

Mr. Porter estimates the weight of boilers and engines for 12 horse power at 2000 pounds. At that proportion 1,256 horse power would weigh more than 104 tons, or five times as much as the whole buoyant power of the mechine; so that so far from carrying 200 passengers and their baggage, it could not carry one-fifth of the engine alone. He also tells us that his propeller is to revolve 200 times a minute. Here, toe, he has made a mistake or an error. At that rate of motion his propeller would not keep up with the stern-ward motion of the air, and would therefore form a drag instead of helping it along if the machine were to move at the rate of motion.—With 200 revolutions per minute he could only escape such a result by placing the fans at such an angle, as to cause him to lose more than half of his power.

If we have made an error of any importance in our reasoning, we will thank any one to point it out. If we are right, then of course he is wrong, and his project impossible. But after all he is not to blame. His reasoning is as correct as the present state of science on such subjects. He has only been unfortunate in having his project lie across that part of science where a great error or oversight has been committed. That the power of inertia must be overcome, seems as plain as the light of the living day, and yet scientific men will be blind to what is continually before their eyes. Apparently they will even stir up a a cloud of dust for fear they might see, as in the case of circular motion. Therefore its effects are so obvious, that they cannot apparently escape conviction, and therefore as if to be wilfully blind, they call it centrifugal force, and thus under a new name, escape identity, where principles are perfectly identical.

Barker's water wheel is another case of this kind: scientific men have seemed puzzled because theory and practice in that wheel do not agree. The reason is, because like Mr. Porter's project, it lies across that part of science where a great oversight has been committed. Make the proper allowance for the power of inertia, and yeu will find that theory and practice will not fail to agree. So also in air navigation, make the theory right, and the practice will be sure to harmonize.

Having now replied to Mr. Porter's challenge,—having now demonstrated that the speed he contemplates is utterly impossible, it may be interesting to examine another question, viz., what speed may it be possible for him to obtain? or rather what is that speed beyond which we know, with that machine and power, he cannot go? That very convenient rule, the rule of three, will quickly enable us to reply to this question. If 1256 horse power will give 100 miles an hour, what will 12 horse power give? The answer to that question, as any one can prove for himself, is a little over twenty-one miles. If there were no other resistance except those we have based our estimates upon, that would be the speed of his machine; but as there is another, which we have already mentioned, that we have not taken into the calculation, the real speed will be found in practice to be even less than that.

——— I.J.K.

[This is a continuation of the same subject, from page 83. In the next, our correspondent says that "he will give his reasons why the speed of vessels on the ocean may be doubled, and largely increased on our river vessels. So far as the pamphlet spoken of by our correspondent is concerned, he both mistakes its author's qualifications and the views of scientific men in this city regarding its merits. We have never spent an anxious moment about it—but unqualifiedly condemned the project; and those who trusted us upon faith, have been rewarded by seeing our predictions verified. Our correspondent will be pleased to be more explicit in describing his *form of least resistance*, in his next. Let him apply his reasoning to a familiar example, giving the form, moving in the water, &c. In short bring the matter to a focus—the steamboat and ship to their own element—marking out the real conditions, not their probable ones, and *predicate* the *result*.

## Science and Art.

EXTRACTS FROM THE REPORT OF THE SECRETARY OF THE NAVY.

*Electricity.*—Prof. Chas Page is making experiments for testing the capacity and usefulness of Electro-Magnetic power, for purposes of navigation and locomotion. (We believe that $30,000 was appropriated by last Congress for this purpose. We here make this statement, and leave the future to decide for or against us, "that these experiments will bring us no nearer the substitution of electro magnetic power, for that of steam.")

Lieut. Davis is charged with the duty of preparing the Nautical Almanac.

*Steam Ships.*—Contracts have been made with E. K. Collins for the building of the Liverpool line of steamships, to be of no less than 2,000 tons burthen. The Atlantic will be ready this present month. Contracts have been made with A. G. Sloo for the New York and Chagres line of steamships, and with A. Harris for the Panama and Oregon line. The three sea steamers under the contract for the Panama and Oregon line were accepted before the close of the year 1848. From the embarrassments attending the contract with Sloo, the Secretary believes that it will not do to embark public and private means in ocean steamships; "What we want," he says, "is an independent STEAM NAVY." It seems that by Act of Congress in 1843, 1844, and 1848, the sum of $250,000 was appropriated to build a war steamer, principally of iron, by R. L. Stevens, and the contract was renewed three times in the above years, but he has not yet furnished the precise plan nor made any progress, and no more payments will be made.

*American Hemp.*—The opinion is entertained that if the Government will make known its willingness and determination to purchase American water-rotted hemp alone, if it can be procured at a price not exceeding the average price paid for the last five years for foreign hemp, that quantities adequate to the wants of the navy, and of a quality greatly superior to the foreign hemp, would be prepared and offered by the farmers of the West at such points as would suit the convenience of the Government.

## Important Discoveries in Abyssinia.

M. Rocher d'Hericourt, who has lately returned from a voyage in Abyssinia, has brought with him about a score of MS. in the Ethiopian language, all of vast antiquity and great literary value. They are folio in form, bound in red leather, with the Greek cross and strange ornaments on the covers. In some of them the writing runs right across the page; in others it is in columns; in nearly all it is firm and bold in character. Some of the MSS. are on history, religion and science; one is a complete and very curious treatise on the mysteries or of eastern astrology; and one, which appears to have been written at the beginning of the eleventh century, contains a copy of the Bible, which differs, in some respects, from the ordinary version. To obtain these treasurers, M. d'Hericourt passed a long time in Abyssinia, had to employ daring, cunning, and force, to go through many extraordinary adventures, and endure many hardships and persecutions. He has besides, obtained a mass of curious information on the religion (which it seems is half Jewish, half Christian,) the manners, and the government of the singular people who inhabit Abyssinia; has ascertained all that could be learned of that country, of which so little is known; and has collected all the facts calculated to throw light on geology, mineralogy, botany, and other branches of science. But what is more practically important than all, is, that he has brought with him numerous specimens of a plant, the root of which, reduced to a powder, is a cure for hydrophobia, both in men and animals. Of its virtues M. d'Hericourt had practical proof; four dogs and a man having been bitten by a mad dog, were by application of the remedy, cured of the hydrophobia which ensued; whilst a fifth dog (bitten at the sams time by the same animal) to which the remedy was not applied, perished in all the agony of that horrible disease.—The virtue of the plant, and the manner of preparing it for use, were explained to the traveller by a potentate of the country, who assured him that it was there generally used, and never failed. The specimens brought over by M. d'Hericourt have been submitted to the Academie des Sciences, and the committee of that learned body has been appointed to test their efficacy. If, as it is confidently hoped, they have not lost their virtue in this European clime, the world will soon be put in possession of the means of curing one of the most frightful diseases to which flesh is heir, and M. Rocher d'Hericourt will have the glory of having conferred an inestimable blessing on mankind.

## Linen vs. Cotton.

A medical gentleman has just come over from the continent, who advocates the wearing of linen next the person, and flannel to be worn over the linen. This is not altogether new, for an elderly gentleman, who reached the age of 77 years, had accustomed himself to this practice, and preserved robust health to the very last. The cholera, it has been noticed, passed very leniently over the linen, compared with the virulency with which it visited the cotton districts abroad; nor was this altogether from the relative conditions of such localities, for let any one, when overcome with lassitude of mind or body, put on a new clean linen garment, and he will experience an instantaneous invigoration of the nervous system, which can only be accounted for by the fact that linen is one of the worst conductors of electricity.—[Cor. Liverpool Mercury.

[We are startled now and again with just see-saw notions as the above, appearing in respectable journals. Flannel is a far better non-conductor, than linen—this every child knows, in fact cotton is better.

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# New Inventions.

### New Nail Machine.

Mr. G. G. Dennis, of Portsmouth, R. I., writing to the Boston Cultivator, says that he has invented a nail machine which is self-operating, feeding itself by feeding rolls. He believes that nails, by his machine can be cut from plates much warmer than is done by machines now in use. Self-feeding nail machines have been proposed before and noticed by us, but there are various ways to do this. We would like to know how the plates can be tilted by feeding rolls—this is a very essential operation in Cut Nail Machines. We can conceive how the plate may be placed on the feed rod, and the rod receive a rolling motion by grooved rollers, transversely, which would tilt the plates—shifting them to the action of the cutting knife; but perhaps Mr. Dennis' plan is very different.

### New Plan for Opening and Closing large Window Shutters and Doors of Stores and Public Buildings.

Mr. Wm. Post, Builder, of Flushing, L. I., has taken measures to secure a patent for a most simple and original means of opening and closing heavy shutters and doors, and packing them in a very small space, and constructing them in such a way that they will be real burglar proofs. The doors are moved in a very unique manner, by small swing cranes, which occupy very little room, but which will enable a boy to move with the utmost ease, the heaviest window shutter or door. The shutters or doors can be made of chilled cast iron plates, at a very little cost comparatively to those now made, and there never need be any fears of breaking the glass of the windows. For our large stores this is an invention of the first importance, and should meet with attention. One is now in operation at Flushing, and has been greatly admired, and persons interested in such things have gone from this city to see it.

### A Steamcoat Fire Engine.

We were present lately, says the Baltimore Sun, at a trial of one of Fulton's patent double-action pumps, on board the steamer Pocahontas, which, with four men at the levers, through a steady three-quarter inch steam of water, through thirty feet of hose, equal to that of one of our best suction engines. It draws water either from the hold of the boat or from the river, as may be desired, and is intended to be used for washing the boat; and in case of fire it would be invaluable, as the men are stationed on the upper deck, and the pump is on the bottom of the boat, the connection being made by rods. They will probably be put upon all the boats in our port.

### New Lock Folder for Pipes.

Mr. Orson W. Stow, of Southington, Mass., has invented a new and useful improvement on Tinsmiths machines for making locks on stove pipe, &c., for which he has taken measures to secure a patent. The improvement consists in employing a guage, to guage the exact catch of the sheet, to form locks on the pipe, of various sizes. Also in compressing the lips that grasp the sheet while the tumbler is folding over on the roller, to make the lock, and opening the lips when the tumbler is turned back. Thus the lips may be very wide and the workman can put in the sheet and take it out with great rapidity. It is a good improvement—no folding slide is used as in some machines.

### Incombustible Cloth.

At a meeting of the British Association, Sir David Brewster read a paper "On a specimen of incombustible cloth, for the dresses of ladies and children, manufactured in Dundee, by Mr. Latts." This cloth is printed calico, of which several specimens were prepared by immersion in phosphate of magnesia. When inflamed it soon went out without the flame spreading and Sir David stated that a spark of red coal would not ignite it.

### Improvement in Making Iron.

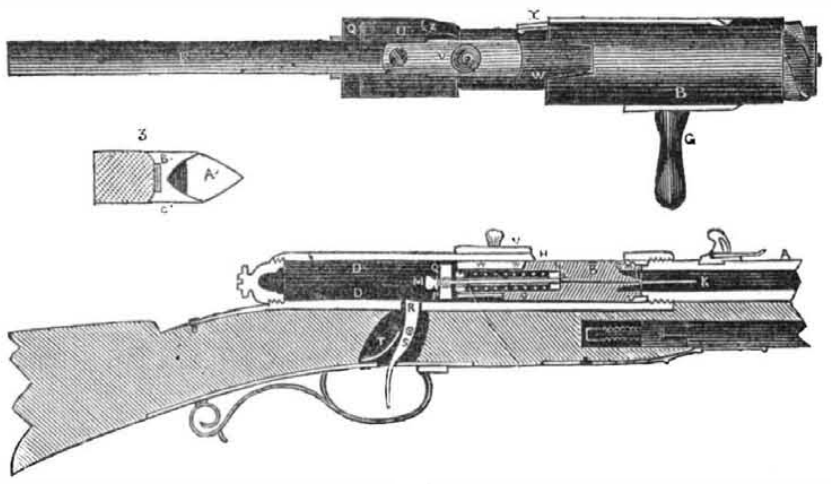
Mr. A. Dickerson, of Middlebrook, N. J., has invented a new process of making iron, whereby, it is stated, he produces as good iron from anthracite coal as can be made by charcoal.

## THE FAMOUS PRUSSIAN BREECH-LOADING RIFLE.

This is the great Prussian Rifle, known by the name of the *Zund Nadel* (darting needle.) The light infantry of the Prussian army are all armed with this fearful weapon, and in the late war with the Danes, and in some encounters with the people, it proved terribly advantageous on the side of Prussia. It has a number of points about it, very different from all other breech loading fire-arms, but we will state three of them before describing the engravings, to make the description easier to understand. First, It uses a different cartridge and no detonating powder, but a friction needle—*darting* needle (zund nadel), which pierces the bottom of the cartridge and ignites the powder by a friction combustible priming. All this is done inside, and it is certainly as efficacious in wet as in dry weather. Second, An air chamber behind the cartridge, in which the expanded air acts to force out the ball. It carries a ball 800 yards, and is as effective at that distance as a musket at 150, and in that case, for picking off artillerymen on the field, it was said by a celebrated American General, who beheld its effects, "their occupation's gone." Third, The sliding breech-pin and the manner of operating and fastening it in an inclined butt of the breech.

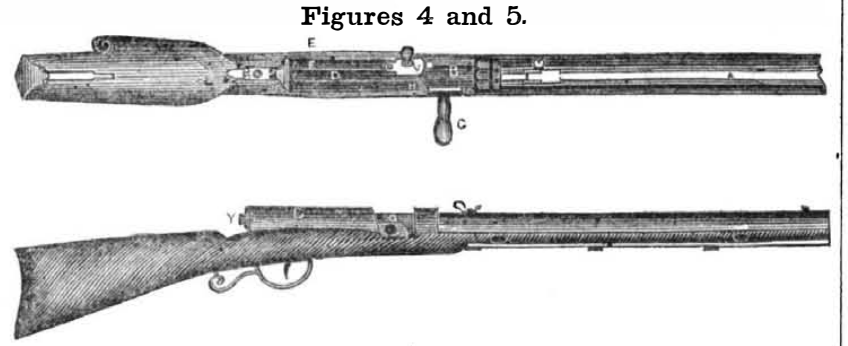
Figure 1 is a view of the breech-pin separated from the barrel. Figure 2 is a longitudinal

**Figures 1, 2, and 3.**



vertical section, showing the interior. Fig. 3 is the cartridge. A is the picket bullet; B the friction combustible priming; C the paper machie case. Figure 4 is a plan view of the rifle, and figure 5 a side view. The same letters refer to like parts. There is a tube behind the breech of the barrel, forming a chamber, and there is a slot on its top for the breech-pin to slide in. The breech-pin can be taken out entirely by unscrewing the cap, Y. This is best seen in figure 5; A is the barrel, it is enlarged at the breech to receive the breech-pin, the office of which is to open to put in the cartridge, and shut to enclose it perfectly, &c. B is the breech-pin with a short screw, C, (fig 1) on its forward end, which. by a quarter turn. locks into the breech butt of the barrel. G is a handle to operate the sliding breech-pin, which is of a tubular form. The breech-pin sides in the tube, D. F is a projecting piece of the breech-pin, to guide the said pin when the cap, Y, is off, and the pin put in the tube, also to guide it back and forth. The forward end, H, of the tube, D, is made of the form of the segment of a helix, so inclined that when the sliding breech-pin is pushed forward, after the cartridge is inserted in the breech butt of the barrel, and then turned to the right to screw into the breech of the barrel, the forward shoulder of the projection, F, acting on the said inclined recess, will aid the thread in forcing in the breech-pin, and during the discharge, will aid the screw thread in resisting the recoil. In this way the breech-pin is held firmly in its place during the discharge of the piece—a very important combination indeed. The forward end of the breech-pin is a strong hollow air chamber, I, behind the cartridge, and the air contained therein is expanded by the combustion in the cartridge, and aids to force out the ball,—this is in accordance with scientific experiments. In the centre of this hollow chamber, is a projecting piece, in which is drilled a centre hole, through which the darting steel needle, K, projects and slides, (fig. 2.) This is the needle that pierces the cartridge and inflames the priming. The needle is secured to a small fly-spring carrier, something like that kind used in small guns for juveniles. L is this carrier. It has a coiled spring, O, abutting against its forward end, (the dots, fig. 2,) and abutting with its back end against a collar of the breech-pin, seen inside of the catch, P, of the carrier, which is attached by a screw to the head, M, of the needle. To load, the handle G is turned to the left, and the breech-pin drawn back in the top slot of the tube, when the carrier disc, P, is caught by the sear, R, of the trigger, the carrier held, and the cartridge is inserted in the butt of the barrel. The breech-pin is then moved forward, and the shoulder turned into the inclined recess. By drawing the trigger, S, the carrier is disengaged, and the spring darts the needle, K, into the end of the cartridge, to effect the discharge. U (fig. 1,) is a ring of

**Figures 4 and 5.**



the tube, into which the breech-pin slides accurately, the said ring being placed forward of the disc, P, of the carrier. V is a bar which fits into the slot of the tube, and when the breech-pin is forced home, and this bar pushed forward, it covers up the slot, and its forward end is fitted to enter a recess, W, in the breech-pin. When the breech-pin is locked in its place, and the bar, V, pushed in its place, there is thus a most effective bracing to prevent the breech-pin yielding in the least to the recoil of the discharger. X is a spring fitted into a recess of the breech-pin, and it has a projecting catch (not seen) which passes into a hole in the breech-pin, to drop before the carrier when it is drawn back, to hold the carrier during the act of loading, to prevent accidents by the touch of the trigger; but when the gun is loaded, by pushing forward the bar, V, the needle carrier is relieved from this to be under the complete control of the trigger. Z is an incline on the bar, that goes under the spring, X, and draws out the stop in the interior, when the bar, V, is pushed forward. All this being done at the breech, it can be performed with astonishing rapidity, and there is as little mechanism (in fact less) about the carrier, &c., than there is about a good lock. The Gun itself is compact and simple. The whole of the light cavalry of the Prussian army are to be provided with it, and terribly effective will it prove in their hands. It would be the prince of weapons for our mounted riflemen in the West. Ten shots can be fired by it in one minute. The distance to which the ball is forced is astonishing. The inventor is Mr. Charles Hartung. of Prussia, now of this city, a modest but superior mechanician and inventor. The assignee is John B. Klein, Esq., 51 Laight street, N. Y. Communications (*p. p.*) addressed to him will be promptly attended to. It was patented (U. S.) a few weeks ago, and the claim will be found in No. 10.

### Hovey's Straw Cutter.

Worcester County Mechanic's Association.

The following is an extract from the Report of the Agricultural Committee, made at their Fair, in Worcester, Mass., September 1849, on straw cutting. In speaking of the straight knife cylinder, they say,—"Indeed, it is to imitate the action of the spiral knife, and thus secure some portion of the advantage which that peculiar form of knife posseses in a more perfect degree, that the straight knife is placed diogonally upon the cylinder. The practical working of the different machines before them fully confirm the correctness of this assumption. From the old and almost exploded up and down cutter, to the most improved rotary machine with straight knives, the Committee have never seen one which would work with that steady and uniform movement, entirely free from jerking, which characterizes the spiral knife machine.

"The Committee having thus expressed their preference for the spiral knife, examined the various machines before them, to see if there were objections to neutralize this advantage. The Hay Cutter of Mr. Hovey, seemed to the Committee perfectly simple and intelligible, and could, in no sense, be considered a complicated machine. Indeed, one of its chief merits consists in the ease with which, by the turning of a nut, a single knife can be taken off, sharpened, and replaced, without disturbing the others, or, by the turn of a screw, either knife, or one end of a knife, may be elevated or depressed, as it may bear too lightly or too hard upon the roller. It is thus, in the power of the operator, at any time, perfectly to adjust his own machine.

"The Committee believe that there is no greater difficulty in grinding one of the spiral knives than a straight one, or any other straight edged tool of equal length, and some of them have known it done by farmers upon a common grindstone, with perfect ease and success.

"In conclusion, the Committee are unanimously of opinion, that the Hay Cutter patented by Mr. William Hovey, is a machine of uncommon merit, and is liable to no serious objections, and they recommend to the Association the bestowal upon Mr. Hovey of a Silver Medal, as evidence that they appreciate his skill and ingenuity, and the importance of the improvement made by him in one of the most useful implements of agriculture. *Silver Medal.*

These spiral cylinder machines are manufactured and sold, wholesale and retail by the Patentee, at Worcester, Mass., at prices lower than any other Cylinder Cutters made in the United States, of equal size and quality.

William Hovey, Patentee.

J. Mayher & Co., Agents, 197 Water st. N. Y.

### Extraordinary Weather in Georgia.

A correspondent, who dates his letter "China Grove, Talbot county, Ga., 3rd of December, 1849," writes as follows:—"Gathered on the plantation of Col. David Shelton, in Talbot county Georgia, on the 1st of December, some apples of the second crop, well matured and the trees are at this time full of blooms, which will be in progression for the third crop before the first of January, should not the weather change before that time. Beat this, if you can"

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# Scientific American

NEW YORK, JANUARY 5, 1850.


### A Retrospective Glance.

It is a law of human economy that we must go forward or go back; there is no standing still, we must progress or digress. In looking back upon the last three hundred and sixty-five days, we see much for encouragement in the progress of science and art. We cannot point to any great and startling discovery—one that will produce an entire revolution in some branches of art, or that will affect original changes in social economy; like the steam engine, or the telegraph; but we behold much in the inventions and discoveries made, to advance the general cause. In Europe, the contentions and conflicts between various nations, and their rulers, the fierce contentions of civil wars, and the bloody struggles for freedom on one hand, and despotism on the other, has been the means of diverting much of the attention of scientific men from their usual pursuits. The bent of much inventive mind, was "directed by events, not to seek reputation in the cannons mouth," but to take reputation from it; hence, a great number of improvements have been made in the most portable kinds of fire-arms; the most famous of which, is the *Zund Nadel*, the Prussian rifle, exhibited in our columns this week. It is not like many others, for it has been adopted and used, with terrific effect on some of the late European battle fields.

In our own country, we behold completed the largest Suspension Bridge in the world, the skill of Ellett has united the two banks of the Ohio, at Wheeling, by bands of iron, graceful as the tight rope of an entrepid dancer, but strong as the Trojans famous walls. The same genius has flung his iron bands across Niagara's boiling flood, from whence is seen, as never was before, "the radiant sphere that crowns the cataracts brow."

The most wonderful achievement in engineering skill in Europe, is the erection of the Britania Tabular Bridge, a work we believe far transcending in grandeur, the erection of Egypt's proudest pyramid. Indeed, it is a work of so original a character, and so vast in design, that we almost tremble for the result.

All the interesting inventions, and discoveries made in our country, have been described from time to time in our columns. It will repay our readers if they will often take a *retrospective glance.*

France, a nation fertile in invention and discovery, we may say, has added but little to our last year's treasury of knowledge. She has been excited by tumults within and troubles without, and except the discovery of a new tail race of men, reported to the Savans of the Academy of Science at Paris, and which will do to break a joke upon, we may close her chapter on improvements.

In the far, far west, we behold a new empire ushered into existence. The Anglo Saxon race now looks from the shores of our continent, afar over the waters of the Pacific, from the land of the setting, to the land of the rising sun, and that indomitable energy, which belongs to them, now holds the sceptre of dominion on the eastern and western shores and oceans of the old world, and also of the new.

Our country has been blessed with peace, prosperity and abundance. Providence has poured out her *cornucopia* of blessings upon us. "Ours is a land of milk and honey, and every man can sit under his own vine and fig tree, none daring to molest or make him afraid." The blessings we enjoy, can only be maintained by a virtuous and wise conduct in our people, and from the *retrospective* we indulge in a hopeful, happy *prospective*.

### Great Dam at Hadley Falls.

We shall soon present an engraving of this great work, prepared by the engineer, with a full account of the construction, &c., and the canals at the New City. It will be of great interest to many of our readers, as it is a work unique in itself—the greatest of the kind in the world.

### The Properties of the Crank.

We do not like to trouble our readers with a subject which, to many of them, is hacknied and of little interest; but it is sometimes necessary to do this, in order to remove prejudice, correct wilful or ignorant representations, and throw light upon some minds—to do good to only one is a duty. Three separate articles have appeared in the N. Y. Tribune, entitled—"The Steam Engine, what it is and what it may be." They are from the pen of one who appeared in our columns under the signature of "Pulley." Only that we are distinctly mentioned in them, and some statements made that exhibit intentional want of candor, we would not trouble ourselves about them. We will take up his No. 1, of the 21st ult., and his other two in succession. He says "the steam engine, in all its elementary principles and mode of operation, is the same now as it was fifty years ago, and the reason why it has not been improved is owing to a belief inculcated by distinguished European engineers and writers, and afterwards thoughtlessly copied into our mechanical and other journals." He must have been dreaming of improving the pyramids of Egypt when he penned the above, for there is not a single European engineer or American author or paper, that has inculcated such a belief—the whole of them have inculcated different opinions, and the great amount of money expended upon experiments, and the present state of the steam engine, tells with what success. It is true that the elementary parts of the steam engine are the same now as they came from the plastic hands of Watt; but that is not owing to want of experiments and age, surely, is no evidence of a thing being wrong. Is the wedge, the pulley or the screw, to be despised, or those who use them calumniated as opposers of improvements, because these machines are thousands of years old? No. He says, "that in proportion to the value of the steam engine, ten-fold more money have been wasted upon other contrivances which, in the end, have resulted in great benefit and success." We say this is not so, and we presume to know as much about the matter as he does, statistics, not argument, alone can settle such a question. (Owing to the illogical arrangement of his positions, it is not possible to take them up in regular order. First, he darts at the *crank*, then he drops it and goes into a *nothing new—no use* disquisition on steam, and then makes a slash at the *crank* again.) He says, "the crank is the most important and distinguishing feature of every engine now in use." The crank is not an elementary part of the steam engine, and we will make himself prove it, to contradict his own statements, for in another place he says,—"The numerous contrivances, by way of substitutes, which have appeared in model and in print, would indicate a belief on the part of those that produced them, that the crank was not the most natural, effective and economical contrivance for that purpose." Here he tells the plain truth, but all these abortive contrivances gives a mighty preponderance to the claims of the crank. He admits that there have been substitutes for the crank, that it is not an elementary part of the steam engine, for in another place he says, "the crank was not the first mode adopted to give a rotary motion to the propelling shaft through the agency of the connecting rod." The crank is merely a mechanical device (and the best of all others as we shall prove by and bye) to give circular motion to a shaft, by being connected with the piston rod. It is not essential to have a connecting rod. There are hundreds of engines now in operation, that have no connecting rods. There are also numerous steam engines now in operation that have no cranks because cranks are not required in them, but this is an argument of fact, which we will use hereafter, to annul all his deductions.

The object of the author in question, is to prove that more than 50 per cent. of power is lost by employing the crank, and he has found a way to save all this by a *pulley*. He says that the reason why no improvements have been made in the steam engine, in relation to the converting of the one motion into the other, viz., that nothing has been invented as a good substitute for the crank, is owing to the opinions circulated by Scott Russell, Bourne, Galloway, Lardner, and other authors, and the SCIENTIFIC AMERICAN. We confess to the truth of what he says about our opinions, and we still adhere to them. He finds fault with us because we did not comment on Mr. Tobey's communication, which appeared in our columns on the 8th of last month. Now let us explain this. Mr. W. B. Tobey, of Syracuse, wrote us that he had found out a substitute for the crank (as good as a pulley) and wanted to know our opinion. We gave it against him, and advised him to spend no more money on the project. He was not satisfied, but consulted others, and after all would not believe. He tried the experiment on a large scale (by steam.) It was a failure, and he wrote a public letter, to warn others of the rock whereon he had run his vessel.

There are some men, when they get crotchets in their heads, become perfectly unfit to hear or see a good reason against their projects. Mr. Tobey had sense and candor to try, perceive, and admit the truth, the author of the articles in question, does not appear to have such qualities. No. 2 next week.

### To Color Sheep Skins for Door Mats.

BLUE.—Tack the skin around the edges on a flat board, with the wool outside, finely combed, to hang down Then get a vessel large enough to let the board and skin flat into it. Fill up this vessel with hot water and put some sulphate of indigo, well stirred, into it, until the water is of the same depth of color as the wool on the skin is desired to be; then invert the board with the wool side of the skin into the indigo liquor, and let it hang in it until it is the color desired. There should be two holes bored through each end of the board, into which should be inserted strings, forming loops; through these loops should be inserted a pole or stick, (an old broom handle will do) which is made to rest upon the top, across the vessel, to keep the skin from the liquor, but to let the liquor dye the wool. A fire should be placed under the vessel, to heat the liquor to any degree. The liquor may be safely allowed to boil, if it is kept from touching the skin. The skin should not be allowed to get wet, but if it does in the washing, it should receive a little alum water to finish, and then the skin be put out to dry. It should be dried in the air—the board being set up endwise, and changed in position from time to time till the wool is dry. It should then be taken from the board, switched with a rod, and it is ready for use.

When the skin is taken from the kettle, the board must be held in the hands, and the wool side of the skin must be rinsed in cold water until all the acid taste is gone. It then should get a dip in the alum liquor. The alum liquor should taste middling strong—but there is no particular quantity used—judgment can easily settle this. The sulphate of indigo is made by dissolving five parts (such as five ounces) by weight, of finely ground Bengal, or Guatamala indigo, in one part of good (mind, good, new) oil of vitroil. The indigo should be added gradually, in a stone ware vessel, and stirred with a hard wood stick. It should not be used in less than nine days after it is made, but if hastily required, it may be used in three days. This dye should be about the thickness of good molasses. A very small quantity will dye a deep shade. It does not dye a fast blue, but it answers well enough for sheep skins, and the alum to finish prevents the wool from being wet easily afterwards. The sulphate of indigo should be kept in a covered dish, out of the reach of children, or those who do not know its nature. Skins may be dyed blue, in the common old fashioned way that our farmers dye their wool, in the *urine* blue vat, only they must do it with the board, as we have directed, or else dye two skins at once, sewing the two insides together, and dipping them into the liquor, in the same way that morocco dyers do, but this is not a good way for skins, that are intended for door mats. After what we have said, any farmer may dye his own lamb-skin door mats blue.

GREEN.—The skin is to be fixed and treated exactly as directed before, and to the blue liquor in the vessel, some strong fustic liquor is to be added. Fustic is a dye stuff found at all the druggists. It requires a great quantity of it to make a good green. It should be boiled in a separate vessel and the strong liquor added to the indigo liquor. A small piece of alum, about the size of a pullet's egg, should also be added. The color of the liquor will be the guide for the color desired upon the wool of the skin. Do not let it be too dark, for you cannot easily make it light again, but you can make it to the very shade you like, by taking time, and adding a little of the *dye-drugs* (the indigo and fustic) from time to time—all that has to be done is to lift the skin, and set it carefully back again. To deepen the yellow of the green, some people use *turmeric* (another yellow dye-drug) along with the fustic, but its color is so fugitive, that if the sun looks at it, its existence terminates. We would not use it. We will give the receipts for all the other colors in future numbers, rendering them so plain, that "he who runneth may read," and there is not one of our subscribers but who, if not at present, may at some future time, want to use them. What we give we warrant correct, without the possibility of a failure, merely remarking, that the wool must be perfectly free from dirt and grease before it is dyed. The sulphate of indigo must be made with care. If the vitriol is good and new, and the indigo good, anybody, without failure, can make it, and every farmer should have it in his house, for it will dye ribbons and green silk, bombazine and merino frocks for his daughters.

### Scientific Foreign Extracts.

By the late news from Europe we learn that cotton is on the rise in price.

The Government of Bengal have offered the price of 100 rs. for a good and economical machine for separating the cotton wool of India from its seed. For this sum a thousand natives machines might be purchased. Here is a chance for some American—he can win it.

Working models of railways, locomotive engines and electric telegraphs have been ordered from England for the use of a Mahratta Sovereign, whose curiosity had been aroused by what he has heard of those wonders.

Mr. Robt. Stephenson, the English Engineer has been named a Knight of the Legion of Honor. France has done herself honor by this act.

Ebenezer Elliott, the Corn Law Rhymer, is dead. He was a *man*, and one of his most noble lays was on these words, "Let there be Light." He has now gone, we trust, to dwell in "the full effulgence of uncreated light."

### Telegraph Through the Ocean.

The Scientific American is authorized to state that one of our Gutta Percha manufacturers, stand ready to lay down and guarantee its integrity for ten years, a line of perfectly insulated wires covered with Gutta Percha for a sum not to exceed three millions of dollars, to be complete in twenty months from date of contract, (under any forfeiture that may be required.) This grand scheme will receive the attention of Congress at an early day. He is also ready to lay down a similiar line on the upper ground plan, from the Mississippi to the Pacific, to be completed within three years from the date of contract.—[N. Y. Tribune.

[Will some of our practical operators inform us how large and how expensive would be the batteries to operate a line from this continent to Europe. We suppose that the above refers to the Atlantic and the line constructed to England. Every scheme however possible it may be, must all be resolved by dollars and cents—profits and loss. An ocean telegraph company no doubt could be formed if the members were sure of good interest on their investments.

### Machine Shop Burned.

A large brick building occupied by Mr. Tompkins, at Troy, N. Y., as a machine shop, was destroyed by fire, with all its valuable centents. The loss is estimated from $40,000 to $25,00. The fire, it is supposed,, was occasioned by the friction of machinery.

Queen Adelaide, the consort of William the Reformer of England, is dead. She had a pension of half a million dollars. So much saved to England.

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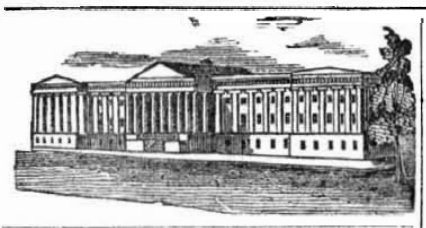

## LIST OF PATENTS CLAIMS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

*For the week ending December* 25, 1849.

To O. Blunt, of New York, N. Y., for improved Lock for fire arms.

What I claim is the mode described, of forming the seer, as a lateral spring with a bevel on the part next the tumbler, and the mode of forming the projection on the tumbler with a similar bevel, so that these two parts operate together to discharge the fire arm, by the direct pull of the trigger, and place the parts in a situation to effect a second or successive discharges, by the reverse motion of the trigger; the whole of these movements and effects being produced by the seer and tumbler, without any intervening parts, substantially in the manner described and shown.

To H. W. Chamberlain, of Pittsfield, Mass., for improvement in Drawing Boards.

What I claim is the combination of the pointed right angled plates, bars moving over the pins, forming the legs on which the board rests, spiral springs, and rod or bale of the form of an ellipsis for clamping and unclamping the paper as before described.

To C. G. Christman, of New York, N. Y., for improvement in Flutes.

I claim, first, removing the third and sixth holes from the ordinary place on the old flute to a point farther down, and sounding the notes produced by the said holes, by keys operated at the natural fingering place, thereby producing with ease a quality of tone now unattainable, or attained only by great skill, and then with uncertainty.

Second, I claim producing the true sharp and flat keys, by means of the double holes and operating keys, as descibed herein.

To Henry Bleecker, Wm. E. Bleecker, and Samuel D. Vose, of Albany, N. Y., for improved process for making thin iron castings.

We claim the process of making thin or light castings of iron, by pouring the metal into a mould of iron that surrounds the article to be cast, entirely, with the exception of the gates; said mould being previously smoked on the inside, and provided with a case or knapsack, which contains a non-conducting material, the whole process being conducted substantially in the manner and for the purpose herein set forth.

To Phineas Dow, of Philadelphia, Pa., for improved Earth-borer and Elevator.

I claim the combination of the augur and the circular plate, fixed upon the same shaft with tbe cylinder, which does not revolve with the shaft, and may be moved along with it; by which I dispense with the force necessary to turn the cylinder, and empty out the excavated material in an easier manner than has heretofore been practised.

To Carmi Hart, of New York, N. Y., for improvement in cast iron Car-wheels.

I do not claim as new or as my invention, corrugated plates or flanges or corrugated spokes: but I claim the form of the car wheel made with the multiplied and reversed or alternate corrugations of the plate or flanges, as above specified and described, and also the combination of the said plates or flanges, with the said spokes so corrugated or bent, as above set forth and described so as altogether to prevent straining or cracking of the metal by contraction in cooling, and giving thereby and by the said combination, greater strength and durability to the cast iron car wheel than has before been attained.

To Benj. Hinkley, of Troy, N. Y., for improvement in Bedsteads.

I do not intend to limit myself to the fastening of the frame thereof by rods, as described and represented, as this may be effected by right and left screw threads being cut on the tenons of the side rails, and other known devices—but I claim the union of the side and end rails of a bedstead into a frame entirely independent of the posts, substantially in the manner and for the purpose herein set forth.

To Lewis Jennings, (Assignees to Geo. A. Arrowsmith) of New York, N. Y., for improvements in breech-loading fire-arms.

I claim, in combination with a magazine for containing the cartridges or loaded balls and which communicates with the barrel, the employment of a sliding charger, operated substantially as herein described, for the purpose of forcing the cartridges as they are required towards the rear end of the magazine, as described.

Second, I claim making the charger in two parts connected by a spring and working substantially in the manner herein described, whereby any difficulty arising from irregular working or yielding of the parts will be avoided, and by which also the transfer of the cartridges or charges to the carrier is insured.

Third, I claim combining the carrier, the breech-pin, and the abutting or stop lever, with the sliding trigger bar, substantially as herein described, whereby all the movements of all these parts are effected by the motions of the trigger bar, as described.

Fourth, I claim the longitudinal fillet on the trigger bar in combination with the pinion having one cog grooved for the passage of the said fillet, substantially as described, by means of which the pinion is made to retain the sliding breech pin in place while the trigger bar completes its motion to discharge the piece and to elevate the stop or abutting lever, as described.

Fifth, I claim the stop which prevents the passage of the cartridges from the magazine, when this is combined with the carrier and magazine, substantially as described.

Sixth, I claim in combination with the receiving chamber and carrier the lever which hugs and steadies the cartridge or ball therein, substantially as described.

Seventh, I claim in combination with the carrier that elevates and transfers the cartridges or charges, the spring catch, by means of which the carrier can be held down to permit the piece to be re-cocked, without transferring a charge to the barrel, substantially as described.

And finally, I claim the spur on the spindle of the cock, in combination with the catch on the sliding breech-pin, substantially as described, by means of which the pull on the cock has the effect to withdraw the breech pin from thr breech of the barrel, as described.

To Wm. Crofton, of Middlesex, England, for tubular packing for pistons and stuffing boxes.

I claim the employment of yielding hollow rings and yielding tubing (of whatever material the same may be compesed) filled with air or gas more or less compressed, for the better packing of the pistons and stuffing boxes of engines worked by steam, air or gas, as before exemplified and described.

To J. W. Moyer, of Utica, N. Y., for improvements in Railroad Trucks.

I claim the combination of the friction wheels and truck wheels with the truck frame, substantially as herein described, in which I employ sliding boxes and connect the parts with springs, while at the same time the axles are made to work steadily in unison and produce the desired effect in a perfect manner.

To Jacob Peirson, of Wilmington, Del., for improvement in Seed-planters.

I claim the peculiar construction of the short axles, as described, in combination with the drilling and seeding machine; said machine containing an intermediate cog wheel for gearing and ungeering the seed roller with the cart or driving wheels, said machine also containing a device for simultaneousiy elevating and dropping all the tubular drills and likewise containing separate lifting and suspending hook rods for raising or suspending one or all of the tubular drills, at the same time.

To Isaac B. Ware, of Camden, N. J., for improvements in Wheels for Carriages.

I do not claim to be the original and first inventor of an iron rimmed wheel, composed of cast iron segments or felloes bound together by a wrought iron band having wood spokes and hub; nor any part of the wheel heretofore used in a similar manner to that herein described in the construction of carriage wheels; but I do claim the manner of employing the screw bolts between the ends of the cast iron felloes of the peculiar construction herein set forth, in combination with said felloes, and the ordinary circular wrought iron tire in the formation of carriage wheels for common roads.

To N. Waterman, of Boston, Mass., for improvement in Portable Lanterns.

I claim the lantern constructed with a closed flamed chamber (having glass or transparent sides) in combination with an open air supplying and chimney tube (extending down through the top of the lantern) and the cap plate or disc; the whole either with or without upper frustrum, and as applied together and made to operate substantially as above specified.

2nd, I make no claim to the use of a reflector in a lantern, as it is ordinarily used. I claim the combination of the reflector, the lamp, the closed flame chamber, and the chimney over the flame, (the same being as above specified and as represented in the drawings) in order that the external downward or supplying current of air shall so encircle the upward current of smoke and hot air proceeding from the flame, as to prevent it in a great measure from smoking or soiling the reflector, and thereby cause it to improperly distribute the light which emanates from the flame.

To John Wiley, of New Orleans, La., for improvements in Machinery for boring Window Blinds.

I claim the combining of the graduating frame spring, stops, or palls, bent levers attached to the rib by chains or cords, with the sliding frame, to which the frame or slat to be bored or mortised is secured, as described.

I also claim the combination of the traversing arms, projecting from the slides moving in the plates, and provided with clamp screws, for securing the ends of the frames, with the hollow traversing boxes, provided with clamp screws and springs, and spring rollers for steadying the frame in its passage as herein set forth.

I likewise claim the combination of the elliptical cams secured to the upright shafts, having cog wheels on their upper ends, with the pulleys, in the manner and for the purpose set forth.

To Lemuel W. Wright, of Plainfield, N. H., for improvement in apparatus and process of rotting hemp and other fibrous materials.

I claim the treating of hemp, flax, China grass and other vegetable fibrous substances in preparing them for spinning into fine yarns by steam, alkaline, and saponaceous solutions and drying the same as herein before described, without handling the same during the process, thereby saving much labor and expense, as well as avoiding loss of material from tangling, matting, &c.

Secondly, I claim the combination of the vessels (three) with their connecting pipes, arranged so as to operate upon the hemp, &c., with the steam and solution, in the manner described herin, or such other arrangements as shall include substantially the same process. He does not confine himself to the form of apparatus.

### DESIGNS.

To H. H. Huntley, (Assignor to Wm. C. Davis) of Cincinnati, Ohio, Design for Stoves.

### RE-ISSUES.

To John Elgar, of Baltimore, Md., for method of attaching sectional boats to each other by means of a rule joint.

I claim the connecting of canal boats by rule joints, for the purpose of adapting them to the curvature of the canal, and of steering them by their action upon each other, upon the same principle, with that by which a rudder is made to steer an ordinary boat. I do not claim the invention of portable section boats, herein before described.

To Abraham Bassford, of New York, N. Y., for improved cushion for Billiard Tables.

I claim constructing a billiard or bagatelle table, consisting of an air-tight elastic tube formed upon and to be used in combination with a solid but flexible and elastic core, which core shall remain within the tube and be permanently a part of the cushion, such cushion to be used inflated with air whenever extraordinary elasticity is required, or on the other hand, capable of being used as a solid elastic cushion, whenever, through accident or choice the tube part is permitted to lose the air by which it was inflated.

I also claim the application of air or gas in a tube or tubes of india rubber or other elastic material, to form the cushion of the bagatelle table, as described. I also claim the mode of extending the tube or cushion in one length around the table, in consequence of which the tubes or cushions may be inflated at the same time with one air pump, whereby all parts are equally inflated, and are of equal elasticity.

To Chas. Goodyear, of New Haven, Conn., for improvement in processes for the manufacture of india rubber.

I claim the curing of caouthouc or india rubber by subjecting it to the action of a high degree of artificial heat, substantially as herein described and for the purpose specified.

And I also claim the preparing and curing the compound of india rubber, sulphur and a carbonate or other salt or oxide of lead, by subjecting the same to the action of artificial heat, substantially as herein described.

To Chas. Goodyear, of New Haven, Conn., for improvement in felting india rubber with cotton fibre.

What I claim is incorporating the fibres of cotton or other substance, with india rubber, by pressing the fibres of a fleece or bat of cotton or other fibrous substance into a sheet of india rubber in the green state without subjecting the fibres, after they have been incorporated, to a stretching or drawing operation, substantially as herein described.

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ST. LOUIS, Dec. 10, 1849.

GENTLEMEN—The following facts are submitted for your opinion:—A steamboat was burned at our wharf in the great fire of last May, having, as part of her machinery, two cast iron cylinders 1¼ inches thick, 6½ feet stroke and 18 inches diameter and known to be perfectly true in the bore. The supposition is that the upper halves of both cylinders were nearly if not quite red hot, the under sides having been protected by the cylinder timbers from the direct action of the fire, were not probably quite so. While they were in this condition the boat sunk, and the cylinders were suddenly cooled down. Upon taking them from the wreck, they were found to be perfect with the exception of the exhaust side pipes and standing heads, these were broken, the receiving side pipes were uninjured, but both cylinders were out of truth. They were put in the boring lathe, and it required a cut of ¼ of an inch to true them up. They were then fitted up in another boat, new piston heads and followers fitted in them, and tried with about 70 lbs. steam, say 300° heat, and worked well and smooth. But upon the boat starting out upon her first voyage after the trial with steam up to 140 lbs., and running one hour, the starboard cylinder commenced cutting at the sides, about half way up, and in a few minutes the head jammed in the cylinder. The piston head was taken out, chipped and filed smooth and on endeavoring to put it back it was found still to be too large in the diameter, although one-eighth of an inch had been taken off, and it would not work until it had been taken down a full quarter. The starboard cylinder worked well about 48 hours when the same defects were developed in it. Upon returning to port the cylinders were examined, and were found to be quite as much out of truth as they were previous to their having been bored out. The action of water upon the heated iron was undoubtedly the cause of the first change from a perfect circle. But what caused the second after it had been perfectly bored out in the lathe? Could steam at 140 lbs. pressure, 300° heat, have caused the variation that was found in the circumference, and which has proved to be permanent, as they have not varied in two months constant work. H.

[This is a case which stands out to us in its own singularity. We would like to have known something about the appearance of the iron that was bored out. Was the grain of the iron coarser and more crystaline, or blistery in appearance, than before the cylinders met with the accident? Every molecule of matter has its own atmosphere, electrical or other, and some have a greater and some a less. The heating and cooling of the cylinders may have so changed the arrangement of the particles of iron inside, to produce the phenomenon described. For example; if the iron inside of the cylinders had been expanded by the heat to

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contract the diameter of the bore half an inch at some parts; and then by their sudden cooling the particles had shrunk back one-fourth of an inch, which would allow for the first rimming out spoken of by our correspondent. The second expansion of the iron when the cylinders were at work, may have been caused by the heat of 300° acting upon the enlarged atmospheres of the molecules (crystals) of the iron, expanding them and pushing out the particles of iron to contract the bore of the cylinders the other one-fourth of an inch, making the half inch spoken of. This is the only feasible, but not positive reason, we can give for the cause which produced the effects described.

### TO CORRESPONDENTS.

"L. B. F., of Ill."—Yours of the 18th, containing $1, was received: the amount has been placed to your credit for 6 months' subscription. We cannot get a clear understanding of your "Seperator" from the mere description. You had better prepare a rough drawing of it and send it to us, accompanied by a description, in that way we can better advise you as to its novelty.

"C. H., of Pa."—We have already given our opinion concerning your drill, and cannot afford the time to furnish the description and drawings of Mr. S.'s patent.

"Michigan."—We cannot publish your article. We have said so much upon the subject, and others have—on both sides—that it is a waste of space. Demonstrate your project, practically, and we shall be happy to notice the fact; but we must say that our views are entirely different from yours.

"T. C., of Pa."—We do not know a rule for the purpose you desire—we have looked for it in vain, theoretically deduced for practice. Should have been happy to have served you.

"J. B. T., of Mobile."—We cannot see how your plan can effect the object. The valve to the drum being only 40 pounds—the steam will rush into it when above that, until at 60 when it will blow off, consequently the whole pressure in boiler and drum will never be above 60 pounds.

"H. D.; of N. Y."—We have commenced the receipts desired, but you can find both the varnish and blacking receipts in Vol. 4, and we could not publish them again at this time.

"J. S., of Ohio."—Yours upon water wheels next week. In reference to the articles to which you refer, they were to be furnished by one who had the most important information in his possession; he is now residing on the Pacific.

"W. W. S., of Pa."—We cannot tell you correctly, but it is our opinion there was not

"B. B., of Mo."—Mr Foster, of this city, has a machine which we think would answer your purpose. It has never been tried upon a large scale, but on a small scale we have seen it work well. It is patented and described in Vol. 3, Sci. Am. It probably could be got by some arrangement, with him, to introduce it, for no great price.

"J. U. D., of Pa."—The Camera was shipped to Norris-town, by Adams & Co's. Express, but not so early as we expected, in consequence of a press of business.

"C. J. W., of Ohio."—Accept our thanks for your favor of the 24th ult. If you desire us to call upon Mr. G—, in relation to that matter, command at any time. $5 credited.

"C. B., of N. H."—No patent can be secured on the devices employed by you for protecting carpets from being injured by chair legs. The ordinary castors answers this purpose well. $2 received and credited.

J. G. S., of Mass."—We cannot give you any information in regard to the "Rifleman." No publisher here seems to possess any knowledge of such a work.

"R. R. W., of Mobile."—We are in receipt of yours of the 24th, stating you had received no reply to yours of prior date. We presume ere this reaches you, our answerwill have arrrived, as we were detained sometime before the necessary information could be obtained.

"L. C. B., of Md."—The price of the sewing machine referred to, are $100.

"J. M. B., of Wisconsin." In answer to yours of the 12th, we would state for your benefit, that you are far from being safe in exposing your invention to the public before taking measures for securing it. Many honest inventors have been robbed in thus carelessly exposing their hard earned inventions. We presume your views of the difference between Mr. Barnum's method and the one submitted for our examination, are correct.

W. P., of L. I., and C. H. R., of Vt.—Your caveats were filed at the P. O., last Wednesday.

C. D. and T. L. V., of Pa.; N. P., of N. Y.; J. C. and G. F. P.. of N. H; N. C. D., of Me.; G. R. S., of Va.; N. S. T., of Md., and H. A. F., of Vt.

The specifications and drawings of your several inventions have been forwarded to the Patent Office since our last issue.

### Grand Sale of Steam Boats.

The interest of the association in the People's Line of North River Steamboats was sold at the Merchant's Exchange, by a Receiver The prices were:

Steamboat Isaac Newton, $127,000; three quarters of Hendrick Hudson, $48,000; Steamboat New Jersey, $8,100; Steamboat Columbia, $16,000; Steamboat Oregon, $36,000; half of the Empire, the Troy, and the John Mason, each, $40,000.

All these were purchased, or bid in, by Daniel Drew, Esq., agent for the line. Capt. Dodge bought the South America for $29,000, and the Rochester for $11,500; the North America went to A. Van Santvoord for $15,000.

### Back Volumes.

We are no longer able to supply Vols. 1, 2 and 3 of the Scientific American. We have on hand about 50 copies of the 4th, Volume bound, price $2,75, if any of our subscribers are intending to order a copy, they had better do so without delay.

### Notice.

Whenever any of our friends order numbers they have missed—we shall always send them, if we have them on hand. We make this statement to save much time and trouble, to which we are subjected in replying, when the numbers called for cannot be supplied.

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### On Tanning Leather.—Preparation of Hides.

(Continued from page 120.)

The next process is that of tanning ; which is essentially the same for all skins, however previously prepared ; and is founded on the following chemical facts. A great variety of vegetable substances, that is, all those that give an astringent taste when chewed, (such as the bark of oak, willow, alder, and many other trees, the gall-nut, tea-leaves, sumac, catechu &c.) when macerated in water, hot or cold, yield to this menstruum a substance, eminently astringent, of a grayish white when pure, which is called tannin or tan. When any kind of skin is immersed in an infusion of tan, it gradually absorbs or extracts it from the water in which it is dissolved, and the skin thereby becomes of a firmer texture, sensibly heavier, no longer capable of putrefaction or any spontaneous change, less easily pervious to water, and no longer soluble in this fluid, even at a boiling heat, which all untanned skin is, whatever be its previous preparation.—the art of tanning, therefore, essentially consists in nothing more than immersing skins for a sufficient length of time, in an infusion of tan from vegetable bark, or other sources, till it is completely saturated with this principle. Hence, the art of preserving the hides of animals by this method, is one of the most ancient and universal of all manufactures ; no apparatus whatever being required to perform it, except a pit or hole for water, in which the tanning vegetable may be put, and the skin thrown in along with it. And even in the most careful and improved methods of tanning, almost equal simplicity is observed in the operation, except that some art is used in regulating the strength of the tan-infusion, and some little manipulation in stirring the hides, to give every part an opportunity of being thoroughly and equally soaked.

The substance used for tanning in this country is almost invariably hemlock and oak-bark. The timber being felled in spring, (when the sap has risen,) the bark is stripped off, and piled in large stacks, protected from the wet by a shed ; but open at the sides, to admit a free circulation of air through it. The bark, before using is ground into coarse powder, and is thrown into pits, with water, by which an infusion of the tan, and other soluble parts is made, which is technically called ooze. The hides, previously prepared in one or other of the ways above mentioned, are then first put into small pits, with a very weak ooze, where they are allowed to macerate for some weeks, with frequent stirring, or handling, as it is called. The strength of the different oozes is increased gradually, after which the half-tanned hides (if of the thick kind intended for sole leather, and which require very complete tanning) are put into larger pits, with alternate layers of ground bark, in substance, till the pit is filled, over which a heading of bark is also laid, and the interstices filled up with weak ooze to the brim. The hides are thus exposed to the full action of an ooze nearly saturated with tan, and supplied with more of this principle from the bark in substance, in proportion as the skin absorbs that portion already dissolved, till the tanning is judged to be complete. Skin is known to be fully tanned by cutting a small piece of the edge of the hide and observing the change of colour. As far as the tan has fully penetrated, the colour is of a nutmeg-brown, but the rest is white ; and therefore, before the process is complete, the upper and under sides are brown, and a white line or streak is seen in the middle.

Sir Humphrey Davy was the first man who investigated scientifically the affinities of tannin, and the results of his observations and experiments were published in the Transactions of the Royal Society 1803. His papers consist of five parts, containing very important information to the practical tanner, but they are not suited for plain brief articles, like those we publish. He was led to believe that in every astringent bark, the part next the wood contained the greatest amount of tannin. He found that gallic acid never combined or was absorbed by the tannin process, but that the coloring and extractive matter of various barks effected the qualities of the skins in a great degree. Leather prepared with galls was hard and more liable to crack than when tanned by bark. When skin was tanned slowly by weak infusions of catechu, it combined with a great deal of extractive matter, and was made strong, soft and insoluble in water. This extract catechu, which is an astringent of East India production, contains more of tannin than any other substance known—half a pound of the extract being stronger than five pounds of the best oak bark. In the United States, hemlock bark is the principal tannin bark used, because it is so abundant in many places. It has been remarked that our leather is "not to be compared with the English—that it is brittle, appears somewhat rotten, and lasts but a very short time ;" but this is not necessarily the case, for with care, as good leather has been and can be made in America as in any part of the world, because we have astringent barks of a great variety, and some of them possessing the most excellent qualities, which we shall point out in other articles, also various plans that have been proposed to shorten the process.

### History of Propellers and Steam Navigation.

[Continued from page 120.]

HENRY BELL.

After Fulton's successful experiment in America, Henry Bell, a self-taught engineer, constructed a boat at his own expense, in 1811. It was 10 feet wide and 40 feet long and worked with an engine of three horse power, and with paddle wheels. This boat was named the *Comet* and was perfectly successful. The same nautical architect who built her hull, was the gentleman (*John Wood*) who built the hull of the Europa, one of the finest pieces of nautical architecture in the world. So far as it regards paddle wheels—(the propelling devices,) Fulton's and Bell's were identical, but from them both, we can trace two distinct kinds of steam vessels. Our marine or sea steam ships, are built upon the basis of Bell's first boat, and our river boats, upon that of Fulton.

In our School Libraries there is a book containing a Biography of Robt. Fulton, wherein it is stated that Henry Bell assisted to put up the machinery of the Clermont, and afterwards went back and established steam navigation in Britain. This is incorrect. Henry Bell was never in America. The mistake is copied from an error in a Report of a Committee of the House of Commons. We have stated before that more credit should be awarded to Symington than prevailing history allows to him. Fulton saw his boat in operation, and so did Bell ; and Bell took drawings of the machinery and furnished them to Fulton, with whom he was acquainted. Both of these men profitted by Symington's skill, and had sagacity to see his defects, and the genius to remedy them. In the arrangement of machinery to effect a new object, it is as essential to apply the same aright, for success, as to plan the application of it to a new object. It is in this capacity that we would give Symington credit, he being a skilful and ingenious practical mechanic.

It is a fault in the character of most inventors, that they claim too much. Both Fulton and Bell, believed themselves to be the first real inventors of the steamboat. The honor we would assign them, and it is the greatest we can award to them as inventors—is, they were the first successful steamboat inventors—they established steam navigation ; and we cannot sufficiently estimate the importance of their inventions, nor calculate the vast benefits they have conferred upon the human race. Without detracting from the merits of one inventor to garnish the brow of another, we will say, that Robert Fulton was the first inventor who successfully established Steam Navigation in America, and Henry Bell was the first in Europe.

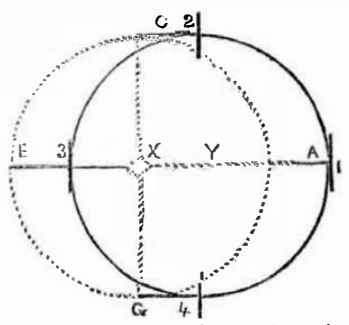
In 1812, a plan to propel vessels without steam, was projected in New York, to completely overturn the Act of Legislature granted to Fulton, without setting the Hudson River on fire. It annoyed Fulton not a little before it was fairly tried. It was nothing less than to propel the vessel by springs and a pendulum. This boat, the wheels of which revolved with great rapidity when on the stocks, stood *stock* still when she was launched into the water. Robert Fulton died in February, 1815. He was one of Nature's noblemen, in every sense of the word, and the nation felt that she lost one of her great men, when he was laid in the grave.

In Buchanan's work, we are told that among the papers of Wm. Linaker, of Portsmouth, England, found after his death, there was described a plan to propel vessels by water, in a different way from that of Rumsey. The steam engine had no piston, but drew the water and expelled it on the principle of Savery's engine.

After the value of side paddle wheels had been successfully established, both in America and Europe, various inventors arose to improve the paddle wheels, by forming plans to make the paddles enter and leave the water vertically. It will be observed, as we proceed in this history, that the majority of all the propelling devices invented since 1811, have this object in view—with what success our readers can well judge now, but will be much surprised hereafter at the variety of foolish plans proposed and patented for the object.

The third boat that was built on the Clyde in Britain, was constructed with paddle wheels to enter and leave the water vertically. Mr. Robertson Buchanan was the projector—an ingenious, scientific man, and above all a practical engineer of the first order. His plan was very ingenious, and is thus described.

Fig. 11.




If two equal rings or circular lines in the same plane, or in planes parallel to each other, be conceived to revolve each upon its respective centre in its own plane, with one and the same uniform velocity, and in the same direction with regard to parts of the rings, or lines alike situated, and any point be taken in one of the lines or rings, and a right line be drawn from that point, parallel to a line supposed to join the centres, until it meets the other ring or circle, then the right line so drawn, will be equal to the line of distance between the centres, and will continue equal and parellel to that line of distance, during the whole of every revolution so made.

The dotted circle and the black circle in the accompanying figure, denote the rings or circles mentioned in the theorem, and Y and X denote their centres ; and the lines 1 A, parallel to an equal to X Y, the line of distance of the centres, will continue equal and parallel to that line of distance, in the positions 2 C, and 3 E, and 4 G, and in all other positions into which the point 1, can be brought, during the uniform, equal and similarly directed revolutions of the two circles.

The amount of friction caused by the eccrentric movement was enormorous, and the scheme was abandoned.

### Gold Washing in South Carolina.

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